NEST’s HeatSmart Southern Tier (HSST) Virtual Webinar Series Schedule

- **Thursday, October 29, 12:00-12:50pm**
  *Geothermal Home Case Study with Dailey Electric*

- **Thursday, November 12, 12:00-12:50pm**
  *Air Source Heat Pumps: Technology and Incentives w/Airsource LLC*

- **Wednesday, November 18, 7:00-7:50pm**
  *Clean Heating & Cooling with Heat Pumps & Energy Efficiency*

- **Thursday, December 3, 12-12:50pm**
  *Clean Heat Beneath your Feet with Dailey Geothermal*

- **Wednesday, December 9, 12-12:50pm**
  *Energy Efficiency Virtual Home Tour (Binghamton) with The Insulation Man*

- **Wednesday, January 13, 2021, 7-7:50pm**
  *Clean Heating & Cooling with Heat Pumps & Energy Efficiency*

- **Thursday, January 21, 2021, 12-12:50pm**
  *Air Source Heat Pump Virtual Home Tour (Oxford)*
The Network for a Sustainable Tomorrow is a non-profit community-based network of programs working towards social, environmental, and economic justice and equity in our region. NEST catalyzes and convenes new initiatives and partnerships, and does outreach and education to build a stronger and more resilient Southern Tier.
Overview

- What is Heat Smart Southern Tier?
- Why HeatSmart?
- Dailey Electric and Geothermal
- Case study
- Incentives & financing
- How to participate
- Q&A
What is HeatSmart Southern Tier?

- HeatSmart Southern Tier (HSST) is a NYSERDA-funded community outreach program that connects you to local heating and cooling and energy efficiency experts who offer the latest clean energy technologies.

- We work to educate the public about sustainable heating and cooling systems through our workshops, webinars and tabling events.
Benefits of Heat Smart Southern Tier

- Reduce energy costs
- Home comfort & safety
- Greenhouse gas emissions
- Community awareness
Where Are We Now?

Main Sources Of Greenhouse Gases in NYS

New York's goal is to reduce these emissions 80% by 2050

- **Transportation**: 34%
- **Buildings**: 32%
- **Electricity**: 20%
- **Waste & Other**: 8%
- **Industry**: 6%

[dec.ny.gov](http://dec.ny.gov)  [facebook.com/NYSDEC](http://facebook.com/NYSDEC)  [twitter.com/NYSDEC](http://twitter.com/NYSDEC)
Heat Smart Southern Tier Program Covers:

- Weatherization
- Heat Pumps
  - Ground Source
  - Air Source
  - Water Heater
HeatSmart Southern Tier’s Competitively Selected Partners

Air Source Heat Pumps
Ground Source Heat Pumps
Home Performance and Efficiency

D & D Refrigeration
(Delaware county)

Air Source
Heat Pump Specialists

Dailey Geothermal

The Insulation Man
Energy Savers at Work
What is a heat pump?
Types of Heat Pumps

Space Heating & Cooling

Ground Source Heat Pump

Hot Water Heating

Air Source Heat Pump

Heat pump Water Heater
Types of Ground Source Heat Pumps

Closed Loop

Horizontal

Vertical
Ground Source Heat Pump Benefits

- An efficient heating/cooling system
- Long system lifetime
- Eliminate fossil fuels from your home
- Can include domestic hot water
Monger Geothermal Case Study

Dailey Electric, Inc.
Manual J Heat Loss
42,977 Heat Loss
19,504 Cooling Gain
Vertical loop bore hole 500’
Loop installation prior to grouting
Hiding of loop pipes - Custom cover by homeowner
Old LP fired hot water boiler with Indirect hot water tank
Phoenix Control box     Symphony Monitoring
WF 5 series NEW Optiheat unit with 2 ton NSW for domestic hot water
Piping to existing hot water baseboards
MultiAqua console unit and high wall unit
Payback Comparison Vs. Fossil Fuel

Investment Economics

| System          | Geo System I | Fossil Furnace
|-----------------|--------------|-----------------|
| Geo System I    | 5 Series - Vapor Injection NEW066 | 16 SEER/Dual Stage-R410A with Boiler-95%/Propane/SparkCondens
| Economics Detail | $51,275 | $10,600 |
| System and Installation Cost | $27,682 | $3,060 |
| Incentive / Rebate | $23,593 | $15,600 |
| Net System Price | $5,00% | $5,00% |
| Expected Fuel Inflation Rate | 5.00% | 5.00% |

Operating Cost Results

|                  | Geo System I | Fossil Furnace
<table>
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<tbody>
<tr>
<td>Annual Fuel Cost plus Inflation</td>
<td>$715</td>
<td>$2,561</td>
</tr>
<tr>
<td>Equivalent CO2 (Avg. US) (lbs)</td>
<td>9.669</td>
<td>17.462</td>
</tr>
<tr>
<td>Equivalent CO2 (Trees/Cars)</td>
<td>24.2 / 0.7</td>
<td>43.7 / 1.3</td>
</tr>
<tr>
<td>Installation Costs vs. Fossil Furnace</td>
<td>$5,593</td>
<td>$23,893</td>
</tr>
<tr>
<td>First Year Operating Savings vs. Fossil Furnace</td>
<td>$1,946</td>
<td></td>
</tr>
<tr>
<td>Simple Payback vs. Fossil Furnace</td>
<td>4.41 years</td>
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Investment Analysis

|                  | Geo System I | Fossil Furnace
<table>
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<tbody>
<tr>
<td>Net Investment Amount</td>
<td>$23,893</td>
<td>$8,593</td>
</tr>
<tr>
<td>Net Investment Amount vs. Fossil Furnace</td>
<td>$1,946</td>
<td></td>
</tr>
<tr>
<td>Annual Fuel Savings vs. Fossil Furnace</td>
<td>64%</td>
<td></td>
</tr>
<tr>
<td>Return on Investment vs. Fossil Furnace</td>
<td>27.55%</td>
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Lifecycle Cost of Ownership

|                  | Geo System I | Fossil Furnace
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</thead>
<tbody>
<tr>
<td>System Service Life</td>
<td>20 yrs</td>
<td>15 yrs</td>
</tr>
<tr>
<td>Replacement Cost %</td>
<td>50%</td>
<td>100%</td>
</tr>
<tr>
<td>Replacement Loan Rate %</td>
<td>10%</td>
<td>10%</td>
</tr>
<tr>
<td>20 year Total Lifecycle Costs</td>
<td>$47,227</td>
<td>$113,417</td>
</tr>
<tr>
<td>20 year Total Lifecycle Costs vs. Fossil Furnace</td>
<td>($66,190)</td>
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Energy Consumption Per Year

**Ground Source System 1 Performance Summary**

**5 Series - Vapor Injection NEW066 with Vertical 1 U-Bend - 1.25' FE**

**WaterFurnace System -**

- WaterFurnace Series: 5 Series - Vapor Injection
- WaterFurnace Unit: 5 Series NEW066
- Geo Unit Cooling Run Time: 191 hours
- Geo Unit Heating Run Time: 1,131 hours
- Hot Water Generation Option: NSW025 HPWH
- Max System Balance Point: 0.0 °F
- Avg. System Balance Point: 0.0 °F
- Summer Peak Demand: 2.5 kW
- Winter Peak Demand: 4.6 kW

**Auxiliary Heat -**

- Auxiliary Heat Type: Electric - Internal duct heat
  - Furnace Fuel: Electric
  - Auxiliary Heat Required: 0 kW
  - Optional Emergency Heat Size: 14 kW

**GeoThermal Loop System -**

- Loop Type: Vertical 1 U-Bend
  - Vertical 1 U-Bend - 1.25’ FE
- Soil Type: Gravel - Silt
- Average Depth: 5.0 ft
- TrenchDore: 2690 ft
- Freeze Protection Minimum: 21.0 °F
- Max Geo Extreme Temp: 66.3 °F
- Average Ctg Loop Temp: 56.6 °F
- Average Hlg Loop Temp: 41.6 °F
- Min Geo Extreme Temp: 32.3 °F
- Geo Temp Min-Max: 52.0 - 75.0 °F
- Deep Earth Temp: 50.0 °F
- Surface Swell: 24.3 °F
- Ground Lag Time: 38 Days
- Soil Conductivity: 0.75
- Soil Diffusivity: 0.0

**Design Data -**

- Design Heating Load: 42,377 Btu/h
- Design Heating Temp Difference: 69.0 °F
- Hazardous Comb/Reactor Option: Radiator 140 °F LT
- Design Cooling Load: 19,904 Btu/h
- Design Cooling Temperature Difference: 17.0 °F
- Hot Water Temperature Setting: 120 °F
- Hot Water Users: 3
- Continuous Fan: No
- Internal Gain: 7,110 Btu/h

**Comfort Conditions -**

- Heating Set Point: 70 °F
- Cooling Set Point: 75 °F
- Start Cooling Temperature: 75 °F
- Weather Location: SYRACUSE, NY

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**Heating -**

**5 Series - Vapor Injection Unit:**

- Electrical Use: 6,210 kWh
- Average Efficiency: 3.59 COP
- % of heating load: 100%
- Annual Cost of Operation: $559

**Auxiliary Heat: Electric - Internal duct heat:**

- Electrical Use: 0 kWh
- Average Efficiency: 0%
- % of Heating Load: 0%
- Annual Cost of Operation: $0

**Total Heating Cost:** $559

**Cooling -**

**5 Series - Vapor Injection Unit:**

- Annual Load: 0.9 million Btu
- Electrical Use: 753 kWh
- Average Efficiency: 11.93 EER
- Total Cooling Operating Cost: $08

**Hot Water -**

**5 Series - NEW025 HPWH:**

- Annual Load: 14.6 million Btu
- Electrical Use: 979 kWh
- Average Efficiency: 4.38 COP
- % of HW Load: 100%
- Total Hot Water Operating Cost: $38

**Total Annual Cost:** $715

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Due to variability in system installation, weather, and individual units, this analysis is to be considered an estimate.
Economics, Incentives, and Financing
<table>
<thead>
<tr>
<th>Technology</th>
<th>Description</th>
<th>Eligibility Requirements</th>
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<tbody>
<tr>
<td><strong>Cold Climate Air Source Heat Pump</strong></td>
<td></td>
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</tr>
<tr>
<td>Partial Load Heating Rebate</td>
<td>$500 per outdoor unit (-$100 per outdoor unit to contractor)</td>
<td>All ASHPs must be NEEP-listed Cold Climate Air Source Heat Pumps</td>
</tr>
</tbody>
</table>
| Full Load Heating Rebate       | $1,000 per 10,000 Btu/h of maximum capacity at 5°F (-$500 per project to contractor) | Partial Load: Must be mini-split heat pump  
Full Load: Can be central or mini-split heat pump, must be sized to 90-120% of building heat load |
| **Ground Source Heat Pump**     |                                                                             |                                                                                          |
| Full Load Heating Rebate        | $1,500 per 10,000 Btu/h of heating capacity (certified by AHRI) (-$500 per project to contractor) | GSHP must be ENERGY STAR certified and meet ENERGY STAR Tier 3 requirements and be sized to 90-120% of building heat load.  
This incentive only covers closed-loop systems. Speak with your installer for more information about incentives for open-loop systems. |
| **Water Heating**               |                                                                             |                                                                                          |
| Heat Pump Water Heater          | $700 per unit                                                               | Must be ENERGY STAR certified and under 120 gallons in capacity                           |
| GSHP Desuperheater              | $100 per unit                                                               | Desuperheaters are installed as an optional component to eligible GSHP systems to offset some of your hot water load. Speak with your installer to learn more about desuperheater integration. |
| Ground-Source Water Heater      | $900 per unit                                                               | This incentive is for ground source heat pump systems dedicated to providing 100% of domestic hot water load. The GSHP must be ENERGY STAR Tier 3 Certified. |

**Custom incentives and incentives for commercial-scale systems are also available based on the expected annual energy savings ($80/MMBtu). Speak with your installer to learn more.**
## Heat Pump Tax Credits

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<tbody>
<tr>
<td>Federal Tax Credit</td>
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<td>26%</td>
<td>$300 until Dec 31, 2020</td>
</tr>
<tr>
<td>Provider</td>
<td>Loan Product Name</td>
<td>Description</td>
<td></td>
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<td>----------------------------------------------</td>
<td>-------------------------</td>
<td>-----------------------------------------------------------------------------</td>
<td></td>
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<tr>
<td>NYSERDA*</td>
<td>Smart Energy Loan</td>
<td>Up to $25,000; terms of 5, 10, and 15 years; 3.49 or 6.99% interest</td>
<td></td>
</tr>
<tr>
<td></td>
<td>On-Bill Recovery Loan</td>
<td>Up to $25,000; terms of 5, 10, and 15 years; 3.49 or 6.99% interest; paid on utility bill</td>
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</tr>
<tr>
<td>ASHP/GSHP Manufacturer Financing (E.g. Synchrony, EnerBank)</td>
<td></td>
<td>Unsecured loans with dealer fees (can be terms of up to 20 years)</td>
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</tr>
<tr>
<td>Local Banks (e.g. Home Equity, consumer loans)</td>
<td></td>
<td>Dependent on bank</td>
<td></td>
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<tr>
<td>Property Assessed Clean Energy (PACE) - Commercial/Non-profit only</td>
<td></td>
<td>Repaid through property tax and tied to the property; Up to 100% of cost, 4%-5.75%, terms of 5-20 years</td>
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Enabling LMI Participation: Income-eligible programs

Assisted Home Performance with Energy Star
Energy Efficiency/Weatherization

Provides those who apply with a discount of **50% of project costs**
- Limit of **$5,000** for single-family
- Limit of **$10,000** for 2-4 unit multi-family
- Eligibility expanded up to 120% AM through Dec. 31
- Includes heat pumps as of Nov 5

<table>
<thead>
<tr>
<th>Household Size</th>
<th>Income Limit</th>
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<tbody>
<tr>
<td>1</td>
<td>$58,856</td>
</tr>
<tr>
<td>2</td>
<td>$78,288</td>
</tr>
<tr>
<td>3</td>
<td>$96,720</td>
</tr>
<tr>
<td>4</td>
<td>$115,128</td>
</tr>
<tr>
<td>5</td>
<td>$133,560</td>
</tr>
<tr>
<td>6</td>
<td>$151,968</td>
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(Income levels subject to change)
Available to homeowners that are under 60% of state median (HEAP/low-income utility rate code eligible) that pay utility bills.

- FREE assessment and efficiency improvements
- Max award increased to $10k until Dec 31.
- Includes heat pumps as of Nov 5.

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<tr>
<th>Household Size</th>
<th>Income Limit</th>
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<tbody>
<tr>
<td>1</td>
<td>$29,928</td>
</tr>
<tr>
<td>2</td>
<td>$39,144</td>
</tr>
<tr>
<td>3</td>
<td>$48,360</td>
</tr>
<tr>
<td>4</td>
<td>$57,564</td>
</tr>
<tr>
<td>5</td>
<td>$66,780</td>
</tr>
<tr>
<td>6</td>
<td>$75,984</td>
</tr>
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</table>

(Income levels subject to change)
What’s the Process For Participating?

1. Sign up for a home energy assessment (and/or)
2. Sign up for site assessment from HSST installer(s)
3. Receive a quote for energy improvements
4. Sign contract for desired systems (if any)
5. Apply for incentives/financing (if applicable)
6. Complete installation work
Questions?
Thank You!

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